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KLARQUIST SPARKMAN LLP
121 S.W. SALMON STREET
SUITE 1600
PORTLAND, OR 97204

EXAMINER	
THOMAS, MIA M	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/826,842	MUKERJEE, KUNAL	
	Examiner	Art Unit	
	Mia M. Thomas	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ~~April 15, 2004~~
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is responsive to applicant's remarks received on 10 October 2007. Claims 1-21 are pending in the application. Claims 1-21 stand rejected. Claims 7, 10-17 are objected to by the Office Action. No claims have been allowed. Claims 1, 10, 14, 18 and 20 are independent. Amendments have been made to Claims 10-4. No new matter has been added. An action of the merits follows.

Claim Objections - 37 CFR 1.75(a)

2. The following is a quotation of 37 CFR 1.75(a):

> The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

3. Claim 6 is objected to under 37 CFR 1.75(a) as failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention or discovery. Regarding claim 6, the term "an indication" at page 2 of 18, line 4 of claim 6, lacks an antecedent basis. However, it appears from the context of the claim when read in light of the specification that " an indication" is in fact referring to the indication that one of the selected DPCM predication modes is flat..." and this will be assumed for examination purposes. For the record, what is the encoding of Claim 6 pertaining to? Is the encoding of the "indication" or "an indication of the DPCM prediction mode? No support has been provided by the specification or independent Claim 1 from which 6 depends, therefore;

For clarity, Examiner will treat the following interpretation of Claim 6 on the merits as listed below:

Claim 6: (Amended) The method of Claim 1 further comprising: determining whether application of the selected DPCM prediction mode to the block portion produces all zero valued DPCM residuals; and encoding an indication of the selected DPCM prediction mode of that ~~the~~ block portion is flat instead of entropy encoding DPCM residuals of the block portion.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.
>
> Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in Sec. 101.
>
> ... a signal does not fall within one of the four statutory classes of Sec. 101.
>
> ... signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of Sec. 101.

5. Claims 10-17 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claims 10-17 is drawn to functional descriptive material recorded on a computer-readable medium. Normally, the claim would be statutory. However, the specification, at page 5 defines the claimed computer readable medium as encompassing statutory media such as at numeral 770, at Figure 7, also at paragraph [0078], for example, wired or wireless techniques and other storage medium that is well known

in the art. (i.e. "ROM", "hard drive", "optical drive", etc, as well as ***non-statutory*** subject mater such as a "signal" or in this instance "another carrier".

> A "signal" embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the four statutory classes of § 101. Rather, "signal" is a form of energy, in the absence of any physical structure or tangible material.

Because the full scope of the claim as properly read in light of the disclosure encompasses non-statutory subject matter, the claim as a whole is non-statutory. The examiner suggests amending the claim to *include* the disclosed tangible computer readable media, while at the same time *excluding* the intangible media such as signals, carrier waves, or carrier signals as they can be interpreted here to mean that the medium can be carried on a carrier "wave" for example. Any amendment to the claim should be commensurate with its corresponding disclosure.

6. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Section IV.C, reads as follows:

> While abstract ideas, natural phenomena, and laws of nature are not eligible for patenting, methods and products employing abstract ideas, natural phenomena, and laws of nature to perform a real-world function may well be. In evaluating whether a claim meets the requirements of section 101, the claim must be considered as a whole to determine whether it is for a particular application of an abstract idea, natural phenomenon, or law of nature, rather than for the abstract idea, natural phenomenon, or law of nature itself.
>
> For claims including such excluded subject matter to be eligible, the claim must be for a practical application of the abstract idea, law of nature, or natural phenomenon. Diehr, 450 U.S. at 187, 209 USPQ at 8 ("application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection."); Benson, 409 U.S. at 71, 175 USPQ at 676 (rejecting formula claim because it "has no substantial practical application").
>
> To satisfy section 101 requirements, the claim must be for a practical application of the Sec. 101 judicial exception, which can be identified in various ways:
>
> The claimed invention "transforms" an article or physical object to a different state or thing.

The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below.

7. Claim 1 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 1 recites the mere manipulation of data or an abstract idea, or merely solves a mathematical problem without a limitation to a practical application. A practical application exists if the *result* of the claimed invention is "useful, concrete and tangible" (with the emphasis on "result") (Guidelines, section IV.C.2.b). A "useful" result is one that satisfies the utility requirement of section 101, a "concrete" result is one that is "repeatable" or "predictable", and a "tangible" result is one that is "real", or "real-world", as opposed to "abstract" (Guidelines, section IV.C.2.b)). Claim 1 merely manipulates data without ever producing a useful, concrete and tangible result.

It is clear that the "method for lossless coding of image and video media" as disclosed at Claim 1 has both useful and concrete application to predictive coding and decoding. This method can be utilized and performed in a "large variety of important applications including high quality digital photography, filmography, and graphics etc". However, the manipulation of the elements comprised at Claim 1 have no practical application based upon (Guidelines, section IV.C.2.b). The claimed elements of Claim 1 simply solve the mathematic operations of the application of the DPCM prediction mode and the entropy coding of the DPCM residuals. It is made obvious that these claimed elements (claim 1) are merely computer instructions that can be performed and executed as shown at Claim 10. Therefore,

In order to for the claimed product to produce a "useful, concrete and tangible" result, recitation of one or more of the following elements is suggested:

- The manipulation of data that represents a physical object or activity transformed from outside the computer.
- A physical transformations outside the computer, for example in the form of pre or post computer processing activity.
- A direct recitation of a practical application;

Applicant is also advised to provide a written explanation of how and why the claimed invention (either as currently recited or as amended) produces a useful, concrete and tangible result.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Sudharsanan et al. (US 6,654,503 B1).

Regarding Claim 1: (Original) Sudaharsanan discloses a method for lossless coding of image and video media ("Method and system for lossless compression coding of a digitally represented image." at abstract; column 1, lines 25-27), comprising:

splitting input image data into block portions (Refer to Figure 1A, numeral 61; column 2, line 64-66);

for an individual one of the block portions ("The pixels in each input block..." at column 2, line 4), selecting one of multiple available differential pulse code modulation (DPCM) prediction modes to apply to the block portion that out of the available DPCM prediction modes yields a closer to optimal symbol distribution of an entropy encoder (Refer to Figure 1A, numeral 67- specifically from the "predictor index"; column 2, line 4-6, further at column 3, line 2-11);

applying the selected DPCM prediction mode to the block portion (Refer to Figure 1A, numeral 71); and entropy encoding DPCM residuals of the block portion (Refer to Figure 1A, numeral s65 and 73 to produce numeral 79; "Prediction residuals (difference between actual and predicted values) are mapped to a non-negative integer scale and are coded using a new entropy-coded mechanism based on a modified Golomb Code (MGC)." at column 2, lines 9-11).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 2-6, 9, 14-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudharsanan et al. (US 6,654,503 B1) in combination with Irvine et al. US Publication Number 2003/0039396 A1).

Regarding Claim 2: (Original)

Sudharsanan discloses all the claimed elements as listed above. Sudharsanan does not specifically disclose converting the input image data into a YCoCg color space format. However, Irvine (US 2003/0039396 A1) in the same field of predictive lossless coding for image or video data teaches: converting the input image data into a YCoCg color space format ("A color signal may be converted from RGB space to YC1C2 space using a RGB to YC1C2 converter 116..." at paragraph [0052]).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify the image data from RGB color space format as disclosed or described by Sudaharsanan to a YCoCg color space format as taught by Irvine because "of the low spatial sensitivity of the eye to color. Many systems sub-sample the Co and Cg components by a factor of four in the horizontal and vertical directions. A full resolution image, known as 4:4:4 format, may be either very useful or necessary in some applications such as those referred to as

covering "digital cinema." at [0052] Irvine. This would make the overall color space and the format thereof, more efficiently suited to be manipulated (coded and decoded).

Regarding Claim 3: (Original)

Irvine teaches wherein the entropy encoding is run-length, Golomb-Rice coding (Refer to Figure 1, numeral 138).

Regarding Claim 4: (Original)

Sudharsanan discloses encoding the DPCM prediction mode selected for the block portion using run-length, Golomb-Rice coding (Following the flow diagram of Figure 1A, we see that the DPCM prediction mode is encoded at Figure 1A, numeral 73, also refer to column 2, line 8-11).

Regarding Claim 5: (Original)

Irvine teaches encoding the DPCM prediction mode and DPCM residuals with separate run-length, Golomb-Rice coding contexts (Refer to Figure 1A, numeral 138 and numeral 154).

Regarding Claim 6: (Currently Amended by Examiner for Claim Clarity)

Irvine teaches determining whether application of the selected DPCM prediction mode to the block portion produces all zero valued DPCM residuals (As is well known in the art, please refer to paragraph [0017]); and

encoding an indication of the selected DPCM prediction mode of that ~~the~~ block portion is flat instead of entropy encoding DPCM residuals of the block portion. (Specifically with reference to Figure 8, numeral 804,808 and 812, as best understood by the Examiner, " The second, or next, DC component value of a given slice is then retrieved 816. The second DC component value is

then compared with the first DC component value, and the difference, or residual, is encoded 820." at paragraph [0073].

Regarding Claim 9: (Original)

Sudharsanan discloses wherein the DPCM prediction modes comprise:

a first mode in which a pixel's value is subtracted from its left neighboring pixel; a second mode in which a pixel's value is subtracted from its top neighboring pixel;

a third mode in which a pixel's value is subtracted from a minimum or maximum of its left and top neighboring pixels;

a fourth mode in which a pixel's value is subtracted from an average of its top and top right neighboring pixels;

a fifth mode in which a pixel's value is subtracted from its top-left neighboring pixel;

a sixth mode in which the difference between a pixel's top and top-left neighboring pixels is subtracted from its left neighboring pixel; and a seventh mode in which a pixel's value is subtracted from an average of the pixel's left and top neighboring pixels.

(Refer to Figure 1A, numeral 67 and adjacent, "Predictor Index").

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art that the "Predictor Index" as exemplified at Figure 1A has to embody a multitude of prediction modes from which to choose. By way of software implementation and manipulations, the user can provide/produce any variation of prediction modes to include at the "Predictor Index" such as those stated at Claim 9. Therefore it would have been obvious to one of ordinary skill in the art to substitute any of the first through seventh modes as suggested at Claim 9 in at the "Predictor Index" of Figure 1A because the substitution of one known element for another

would have yielded predictable results for predicting a DPCM mode for lossless coding or the image data obtained.

Regarding Claim 14: (Currently Amended) Irvine discloses a computer-readable storage medium having computer- executable program instructions stored thereon ~~for~~ operative upon execution in a computer media processing system to perform a method of encoding image or video data, the method comprising: converting image data to a YCoCg color space format; splitting the image data into macro-blocks; for a macro-block of the image data, determining which from a group of available DPCM prediction modes produces residuals closest to an optimal distribution for RLGR coding;
if such determined DPCM prediction mode produces residuals whose distribution is sufficiently close to the optimal distribution, applying the DPCM prediction mode to the macro- block; and RLGR entropy encoding the residuals of the macro-block (Refer to paragraph [0110]; Specifically, Claims 1, 2 and 7 have all be rejected above and it is implied that by way of examples listed at paragraph [0110], the method steps as rejected above can be implemented on a computer readable storage medium. Therefore Claim 14 is rejected for the same reasons, motivation and rationale as listed above at Claims 1, 2, and 7).

Regarding Claim 15: (Original) Irvine teaches wherein the method further comprises: determining whether application of the determined DPCM prediction mode to the macro- block produces flat residuals (As is well known in the art for each individual pixel or macro-block of pixels, please refer to paragraph [0017]);; and if so, encoding the macro-block as a flat macro-block mode indication without the RLGR entropy encoding the residuals of such flat macro-block (Specifically with reference to Figure 8, numeral 804,808 and 812, as best understood by the

Examiner, " The second, or next, DC component value of a given slice is then retrieved 816. The second DC component value is then compared with the first DC component value, and the difference, or residual, is encoded 820." at paragraph [0073]. This process can be done for each individual pixel or macro-block of pixels.

Regarding Claim 16: (Original) Irvine teaches 15 wherein the method further comprises: RLGR entropy encoding the macro-block mode indication using a separate RLGR coding context than for RLGR entropy encoding the residuals (With reference to Figure 10, the macro-block mode can be selected to follow the arrow as suggested by the direction of "A" and the separate entropy coding occurs at "Huffman/Golumb-Rice" for the desired format as illustrated at Figure 10, column 3- "A". This Golumb-Rice coding is separate from the residual Golumb-Rice coding occurring at directional columns "B" and "C" of Figure 10).

Regarding Claim 17: Claim 17 resembles the claimed subject matter of Claim 7. Claim 17 stands rejected for the same reasons, motivation and rationale as stated above at Claim 7.

Regarding Claim 18: (Original) Irvine discloses a method of decoding predictive losslessly coded data of an image or video, comprising: RLGR entropy decoding a macro-block mode (Refer to Figure 2),

Irvine does not specifically disclose a DPCM prediction mode and DPCM residuals, however, Sudharsanan teaches a DPCM prediction mode (Figure 1a, numeral 69) and DPCM residuals (Refer to Figure 1A, numeral 65)

Irvine through application teaches ...for each of a plurality of macro-blocks using separate RLGR coding contexts (Refer to Figure 10, column "B" for residual image data, and column "A" for "Prediction Mode data");

where the macro-block mode of a macro-block is a flat macro-block mode, decoding the macro-block's pixels using a DPCM demodulation that is an inverse of the RLGR-decoded DPCM prediction mode of all zero residuals (Refer to Figure 11, numeral 1116);

otherwise, where the DPCM prediction mode of the macro-block is a no DPCM prediction mode, decoding the macro-block's pixels without DPCM demodulation (Refer to Figure 11, numeral 1128);

otherwise, de-modulating the RLGR-decoded DPCM residuals using a DPCM demodulation that is an inverse of the RLGR-decoded DPCM prediction mode (Refer to the combination of numerals 1116, 1120 and 1136 at Figure 11); and assembling the macro-blocks to form a decoded image data ("Input B represents interframe residual lossy compressed encoded data, which is transferred to a Golomb-Rice decoder 1132. The Golomb-Rice decoder 1132 reverses the function of the Golomb-Rice encoder and transfers the output to an adder 1136. The adder 1136 adds the residual output with the output of the IDCT 1120 to produce lossless, interframe encoded data in the frequency domain. A color transformer 1140 coverts this back to the RGB form for final output. Different variations of color transforms may be utilized, such as those described in provisional patent application entitled "ABSDCT Lossless Algorithm for Digital Cinema Archival Applications filed Jul. 11, 2002, Attorney Docket No. 010421P. Interframe decoding operates in a similar manner." at paragraph [0103]).

Regarding Claim 19: Irvine teaches converting the decoded image data from a YCoCg color

space format to a displayable color space format.

(Refer to Figure 1, numeral 116).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to substitute a YCoCg converter at Figure 2, 10 and 11 for converting the reconstructed image data suitable for display because a coder and decoder operate in an equal but opposite manner and the substitution of a color transformation at point relatable from an encoder to a decoder would yield the same predictable results to one of ordinary skill in the art. Additionally, "The pixel data may then have to be interpolated, converted to RGB form, and then stored for future display." at paragraph [0108]. This application can also be simply substituted for YCoCg data in place of RGB format (color space) and would have also yielded predictable results).

Regarding Claim 20: (Original) Irvine teaches a predictive-lossless coded image or video decoder, ("Figure 11 illustrates a lossless decoder 1100, which operates in an equal but opposite manner as described with the encoder of Figure 9." at paragraph [0101]; Figure 11 numeral 1112 and numeral 1144); comprising:

a run-length Golomb-Rice (RLGR) entropy decoder operating to decode RLGR-encoded DPCM residuals and DPCM prediction mode of a macro-block (Figure 11, numeral 1112, 1132; "In Figure 11, numeral 1136, Refer to numeral 116 in combination with residual (data) adjacent to numeral 1132... B represents inter-frame residual lossy compressed encoded data..." at paragraph [0101]);

a DPCM demodulator for applying an inverse of the DPCM prediction mode to the DPCM

residuals (Refer to Figure 11, numeral 1116); and

a macro-block reassembler for assembling the macro-block with other decoded macro- blocks to form data of a reconstructed image ("The final compressed output then corresponds to the one that uses the minimum number of bits per frame." at paragraph [0097]; "The output of the variable length decoder 168 is provided to an inverse serializer 172 that orders the coefficients according to the scan scheme employed." at paragraph [106]).

Regarding Claim 21: (Original) Irvine teaches an inverse YCoCg converter for converting the reconstructed image from a YCoCg color space to a color space suited for displaying the image (Refer to Figure 1, numeral 116).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to substitute a YCoCg converter at Figure 11, numeral 1140 for converting the reconstructed image data suitable for display because a coder and decoder operate in an equal but opposite manner and the substitution of a color transformation at point relatable from an encoder to a decoder would yield the same predictable results to one of ordinary skill in the art. Additionally, "The pixel data may then have to be interpolated, converted to RGB form, and then stored for future display." at paragraph [0108]. This application can also be simply substituted for YCoCg data in place of RGB format (color space) and would have also yielded predictable results).

12. Claims 7, 8, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudharsanan et al. (US 6,654,503 B1) in combination with Passaggio et al. US (6,317,520 B1).

Regarding Claim 7: (Original)

Sudharsanan discloses all the claimed elements as listed above. Sudharsanan does not specifically disclose wherein the selecting the DPCM prediction mode comprises: determining whether the DPCM prediction mode yielding the closer to optimal symbol distribution for entropy coding is sufficiently close to the optimal symbol distribution for entropy coding and if not sufficiently close, applying no DPCM to the macro-block before the entropy encoding.

By way of example,

Passaggio teaches wherein the selecting the DPCM prediction mode ("A known solution in the literature, is to make O the difference between successive values:

(1) o (1) =s (1)

(2) o (i) =s (i)-s (i-1), from which the original sequence can be perfectly reconstructed as s(1)=o(1), s(i)=o(i)+s(i-1). The method is known as Differential Pulse Code Modulation (DPCM)." at column 2, line 59) comprises: determining whether the DPCM prediction mode yielding the closer to optimal symbol distribution for entropy coding is sufficiently close to the optimal symbol distribution for entropy coding (Refer to Figure 7a; further refer to column 6, line 41-54); and if not sufficiently close, applying no DPCM to the macro-block before the entropy encoding (Refer to Figure 7b).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify Sudharsanan by Passaggio to fully exhibit the DPCM prediction modes and their various functions as claimed, since Passaggio shows that the prediction modes in a lossless scheme by way of examples. The combination of Sudharsanan and Passaggio illustrates the low-level interpretation of the composition of the DPCM prediction modes. Passaggio demonstrates a conventional representation of DPCM prediction modes, and it would

have been obvious to one of ordinary skill in the art at the time that the invention was made to add the detailed description of the "prediction modes" by way of example to exemplify that the method of Sudaharsanan in combination with Passaggio can produce a more efficient method of predictive lossless coding in image and video media.

Regarding Claim 8: (Original)

By way of example, Passaggio teaches wherein the DPCM prediction modes comprise modes designed to produce an optimal distribution for entropy coding for block portions whose image content is predominantly a horizontal major edge, a vertical major edge, ramp diagonal edges, bands, and banded horizontal ramps (Refer to Figure 6a; "The property being exploited in this case is that the statistical distribution function for the pair [s(i), s'(i)] is strongly peaked around the main diagonal s(i)=s'(i), with decreasing probability for the sub-diagonals." At column 5, lines 9-35).

13. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudharsanan et al. (US 6,654,503 B1) in combination with Irvine et al. US Publication Number 2003/0039396 A1) and further in view of Hirabayashi et al. US (6,101,282).

Regarding Claim 10: (Currently Amended)

Sudharsanan discloses applies the chosen DPCM prediction mode to the macro-block (Refer to Figure 1, numeral 73)

Sudharsanan discloses a multi-mode differential pulse code modulation (DPCM) process operating on an individual macro-block of the input image data (Refer to Figure 1A, numeral 67 and adjacent, "Predictor Index", For clarity, the user can access a plurality of DPCM prediction

modes from the "Prediction Index" in which the system will further execute based on the computer readable media instructions); and an entropy coding process for performing a run-length, Golomb-Rice coding of the DPCM residuals of the macro-block ("...coded using a new entropy-coded mechanism based on a modified Golomb Code (MGC). In addition, a novel run-length encoding scheme is used to encode specific patterns of zero runs." at column 2, line 11-16).

Hirabayashi teaches a computer-implemented media system providing predictive lossless coding of image or video media content, the system comprising a computer comprising one or more computer-readable media and a processor, the computer-readable media containing instructions, which, when executed by the processor on the computer, cause the computer to perform the actions of: ("Figure 11 is a block diagram of an encoding apparatus..." at column 8, line 59):

a macro-block division process for separating input image data into macro-blocks ("The block cut out circuit 111 reads and stores the image data...in the unit of a block of 8x8 pixels." at column 9, line 14);

a [manner in which] to choose one of multiple DPCM prediction modes that produces a residual distribution for the macro-block (Refer to Figure 11, numeral 108),

a "prediction mode that [to] more closely match an optimal run-length Golomb-Rice (RLGR) entropy coding distribution ("Still another object of the present invention is, in encoding the target data by switching the encoding method for each of the block units, to effect entropy encoding according to each of the encoding methods to be used for each block unit." at column 2, line 22) It is important to note that the simple substitution of a Huffman Encoder at Figure 11, numeral 104 can be substituted for a RLGR which would yield the same predictable results as

one of ordinary skill in the art would be able to deem obvious at the time that the invention was made.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to modify, by way of example, Hirabayashi with Sudharsanan because Sudharsanan discloses a multi-mode DPCM process. By way of simple substitution, Hirabayashi can substitute the multi-mode DPCM process because it already embodies elements of lossless coding that are well known in the art. The combination of the well known elements of Hirabayashi and Sudharsanan would have yielded predictable results to one of ordinary skill in the art at the time that the invention was made.

Regarding Claim 11: (Currently Amended) Claim 11 equally resembles the claimed subject matter of Claim 2. Claim 11 is rejected for the same reasons, motivation and rationale as listed above at Claim 2.

Regarding Claim 12: (Currently Amended) Claim 12 equally resembles the claimed subject matter of Claim 8. Claim 12 is rejected for the same reasons, motivation and rationale as listed above at Claim 8.

Regarding Claim 13: (Currently Amended) Claim 13 equally resembles the claimed subject matter of Claim 9. Claim 13 is rejected for the same reasons, motivation and rationale as listed above at Claim 9.

Response to Arguments

- **Claim Objections**

Specifically with regards to Claim 14

1. Applicant's arguments, see page 8 of 18, filed 10 October 2007, with respect to Claim Objections to Claim 14 have been fully considered and are persuasive. The objection of Claim 14 has been withdrawn.

2. Applicant's arguments, see page 8 of 18, filed 10 October 2007, with respect to 37 C.F.R. 1.75(a)-Claim Objections (claims 7, 14 and 17) have been fully considered and are persuasive based upon applicant's detailed explanation of the term "sufficiently close". When referring to the term "sufficiently close" applicant is in fact stating that "the term "sufficiently close" is used to mean "sufficiently close for entropy encoding". As such, one of ordinary skill in the art would recognize the requisite degree of closeness required, and thereby would be reasonably apprised of the scope of the invention." The objections of Claims 7, 14 and 17 has been withdrawn.

3. Applicant's arguments, see page 10 of 18, filed 10 October 2007, with respect to 37 C.F.R. 1.75(a)-Claim Objections for Claims 10-17 have been fully considered and are persuasive. Claim 10 has been amended to provide the structure in the preamble of the claim language. Claim 10 has been amended to clearly provide for the apparatus of a computer implemented media system which performs a series of actions. Claims 11-13 depend from independent claim 10 and recite similar language in the preamble. The objection of claims 10-13 has been withdrawn. Equally, Claim 14 has been amended to teach the product of a computer-readable storage medium with instructions, when executed, perform a given method. Claims 15-

17 depend from independent claims 14 and recite similar language in the preamble. The objection of claims 14-17 has been withdrawn.

- **35 U.S.C. 101 Rejections-Claims 10-17**

4. Applicant's arguments see page 10-11 of 18 filed 10 October 2007, with respect to 101 Rejections (claims 10-13) have been fully considered and are persuasive, since Claim 10 has been amended to embody the program on a computer readable medium. The 101 rejection of Claims 10-13 stand however based upon the judicial exception as rejected above.

5. The rejections of Claims 14-17 are herein maintained and are listed above under 35 U.S.C. 101 Rejections above.

- **Information Disclosure Statement for Review**

It appears that the Examiner has overlooked one of the prior art exhibits made of record in the previous Office Action. The Examiner submits with this Office Action a fully-considered IDS Form 1449 with the Examiner's initials' and complete consideration. Examiner herein apologizes for the minor oversight.

- **Claim Rejections----35 U.S.C. 102 and 103**

6. Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection. Newly rejected claims are listed above.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Haskell et al.	***US 6,005,622***
Rose	***US 6,731,811 B1***
Yu et al.	***US 6,621,934 B1***

Wu---"Lossless Compression of Continuous-Tone Images via Context Selection, Quantization, and Modeling" IEEE Transactions on Image Processing, Vol. 6, No. 5, May 97, pages 656-664.

Link---"Optimal Use of Markov Models for DPCM Picture Transmission over Noisy Channels" IEEE Transactions on Communications, Vol. 48, No. 10, October 200, pages 1702-1711.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mia M. Thomas whose telephone number is 571-270-1583. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Mia M Thomas
Examiner
Art Unit 2624

Mia M. Thomas

VIKKRAM BALI
PRIMARY EXAMINER